

WINTER FOOD HABITS OF COUGARS FROM NORTHEASTERN OREGON

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ABSTRACT.— Sixty-four cougar (*Felis concolor*) stomachs and 41 intestinal tracts were examined for food items in northeastern Oregon from 1976 through 1979. Food items, in order of decreasing frequency, were mule deer (*Odocoileus hemionus*), North American elk (*Cervus elaphus*), porcupine (*Erethizon dorsatum*), snowshoe hare (*Lepus americanus*), and deer mouse (*Peromyscus maniculatus*).

Bounties existed on cougars in Oregon from 1843, when the Oregon Territorial Government offered them on most "predators," until the bounty system was repealed by the 1961 Oregon Legislature (Ebert 1971, Kebbe 1961). Once found throughout most of Oregon, the decline of the cougar during the 1950s and early 1960s aroused concern for its continued existence within the state. The cougar was classified as a game animal in September 1967 (Oregon State Game Commission 1967). The hunting season was immediately closed and remained closed until December 1971, when the first controlled hunting season was opened. Twenty-two cougars were killed by hunters during the December 1971 and December 1972 hunting seasons.

Little is generally known about food habits of the cougar (Young and Goldman 1964), particularly in Oregon, where indiscriminate bounty hunting kept cougar populations too low for such studies. Maser et al. (1981) and Toweill and Meslow (1977) discussed cougar food habits in general; Toweill and Meslow (1977) also discussed the food habits of those cougars killed during the 1971 and 1972 hunting seasons. The purpose of this paper is to present data on the winter food habits of cougars from northeastern Oregon and to offer some tentative interpretations of these data.

METHODS

Sixty cougars were obtained from hunters during four one-month hunting seasons (De-

cember 1976, 1977, 1978, 1979) in northeastern Oregon counties: Baker (5), Union (15), and Wallowa (40). An additional four cats were obtained from Umatilla (1) and Wallowa (3) counties; one was killed illegally and three were killed because of their proximity to livestock.

Cats, killed by hunters, were brought into an Oregon Department of Fish and Wildlife office within 48 hours of being killed. Most cats were received intact, but a few had been field dressed.

Each individual was sexed, weighed, measured, and, if intact, eviscerated. Each cat's heart, lungs, liver, stomach and intestinal tract, and reproductive organs were placed in separate plastic bags, labeled, and quick-frozen for later analysis. The present food habit study was done in conjunction with a study of endoparasites, which necessitated separately examining the stomach, small intestine, and large intestine. Each cougar thus had three separate analyses for food items. This procedure worked well because we could determine what appeared to be the contents of two meals for each cat that contained food in its alimentary canal—one meal in the stomach and a different meal in the colon. The two meals "mixed" in the small intestine. Thus, by identifying the stomach contents first, the colon contents second, and the small intestine contents third, we had a cross-check on the content determinations. Materials from the small intestine usually contained elements of both stomach and colon contents and have not been included in the discussion. Further, by identifying the plant

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material in the alimentary canal, we could determine, by tree associations and by inference, the general habitat within which the cougar had taken its meal.

RESULTS AND DISCUSSION

Results of the food habit study are given in Tables 1 and 2. The sexes of cougars analyzed during this study probably approximates a random sample (Table 3). Although cougars are, in some sense, opportunistic predators (Robinette et al. 1959, Sitton 1977) their main diet was mule deer, North American elk, and porcupine (Table 1), which concurs with studies reviewed in Toweill and Meslow (1977). Stomachs ranged from being empty to containing 3.5 kilograms of mule deer.

Mule deer was the most frequently consumed prey; North American elk was second (Table 1). In eight cases, the consumed elk could be classified as adult or calf. From the limited sample, the five male cougars that had eaten, and presumably killed, adult elk were in the upper size-limit of the overall sample: 68 kg (150 lbs)—the largest cougar—66 kg (146 lbs), 64 kg (140 lbs), 64 kg (140 lbs), and 62 kg (137 lbs). The average weight of the five male cats was 64.8 kg (142.7 lbs). On the other hand, the three cats that had eaten known calf elk were a female (32 kg—70 lbs), a male (41 kg—91 lbs), and another female (50 kg—110 lbs). The average weight of these three cats was 41 kg (91 lbs). The 50-kg female that killed a calf elk was 12.3 kg (27 lbs) lighter than the smallest of the males that killed an adult elk. Thus it seems that the larger a cougar, the larger a prey animal it can kill, and the more energy efficient such a kill will be.

TABLE 1. Prey species consumed by 60 cougars killed in December.

Content	Stomach % frequency	Colon % frequency
Mule deer	55.3	42.1
Elk	21.3	15.8
Porcupine	10.6	5.2
Unidentified hair	6.4	10.5
Snowshoe hare	4.3	—
Bird	2.1	—
Lagomorph	—	5.2
Cougar hair	—	21.1
TOTAL	100.0	99.9

Porcupine would seem to be an energy-efficient meal as soon as a young cougar is old enough to kill because these large rodents are slow, easily caught, and seem to be readily dispatched by cougars. Although porcupines occurred in the diet with only 10.6 percent frequency in stomachs and 5.2 percent frequency in colons in our study, Robinette et al. (1959) found them to account for 19 percent of the cougar's diet, based on scat analysis, in Utah and Nevada. Evidence—in the form of quills embedded in and around the gum lines, the skinned shoulders and feet, and embedded in stomach walls—indicated that most cougars encounter porcupines at some time during their life. Such quills, represented by their embedded tips, appear as dark streaks. Apparently, a cougar's body readily absorbs the softer, light shaft of a quill but not the harder, dark tip.

Cougars seem to be variously adept at eating porcupines. For example, some cougars appear to avoid the quills as much as possible and have only a few hairs mixed with the porcupine flesh in their digestive tract, whereas others eat almost everything. In addition, a cougar killed in 1973 had eaten a porcupine about an hour prior to being shot. It had consumed the entire porcupine, except the head and digestive tract. The quills had already begun to soften in the cat's stomach.

The proportion of a cougar's diet that is composed of porcupine is probably related to the availability of the prey. Connolly (1949 cited in Robinette et al. 1959), for example,

TABLE 2. Miscellaneous associated items consumed by 60 cougars killed in December.

Content	Stomach % frequency	Colon % frequency
Grass	20.0	23.8
Douglas-fir needles	17.1	4.8
Grand fir needles	14.3	19.0
Ponderosa pine needles	14.3	14.3
Engelmann spruce needles	11.4	9.5
Twigs	5.7	4.8
Soil	5.7	23.8
Alder leaf	2.9	—
Lichen (<i>Alectoria fremonti</i>)	2.9	—
Larch needles	2.9	—
Pebbles	2.9	—
TOTAL	100.1	100.0

indicated that, in his Utah study area, cougars killed one porcupine per week in winter. Of the 64 cougars examined in this study, plus 97 cougars examined prior to this study, none showed ill effects from encounters with porcupines, even when quills remained embedded in a cat's tissues. Such lack of serious damage or infection from porcupine quills has also been noted in the fisher (*Martes pennanti*) and spotted skunk (*Spilogale putorius*) (Maser et al. 1981).

The snowshoe hare occurred fourth (of the identifiable items) in the cougars' stomach contents (Table 1). Because these hares were relatively abundant in the coniferous forests of northeastern Oregon during our study, their low frequency (4.3 percent) indicates that they were taken incidentally by the cougars.

The lagomorph remains in the colon (Table 1) were either snowshoe hare or mountain cottontail (*Sylvilagus nuttalli*), but they could not be identified to species once they reached the colon. The bird (Table 1) was probably a grouse.

Miscellaneous items associated with food are given in Table 2. Other than grasses, some of which were intentionally eaten, identifiable vegetation gave clues to the habitats in which the cats presumably had been hunting and had consumed their prey. Of the five stomachs that contained elk and vegetation, Engelmann spruce (*Picea engelmannii*) occurred in 20 percent, western larch (*Larix occidentalis*) in 20 percent, grand fir (*Abies grandis*) in 40 percent, and ponderosa pine (*Pinus ponderosa*) in 20 percent. Of the 13 stomachs that contained deer and vegetation, Engelmann spruce occurred in 15 percent, grand fir in 8 percent, ponderosa pine in 38 percent, and Douglas-fir (*Pseudotsuga menziesii*) in 38 percent. From the conifer needles in the stomachs, it seems that elk were killed primarily in denser, moister forests because the Engelmann spruce, western larch, and grand fir accounted for 80 percent of the needles, whereas ponderosa pine, characteristic of more open habitat, accounted for only 20 percent. With respect to mule deer, on the other hand, ponderosa pine-Douglas-fir, which occurs as a drier, more open forest, accounted for 76 percent of the conifer needles, as opposed to the moister, denser forests

of grand fir and Engelmann spruce, which represented 23 percent of the needles. Thus, it seems that the elk were usually killed in dense forest where the advantage would lie with the stalking cougar and the smaller, more easily subdued mule deer was most often hunted in more open habitats.

In addition to vegetation, several cats had eaten much soil—evidence of having cleaned up a kill.

CONCLUSIONS

Of the 60 cougars killed during the December hunting season, 31.6 percent had virtually or totally empty stomachs, and 30 percent had empty colons. The 4 cougars killed because of their proximity to livestock also had virtually empty stomachs. Thus, if the stomachs or the colons are used independently as the sole source of food habit data, a large sample is needed. If, on the other hand, both the stomach and colon contents are used independently but together as dietary samples, the chances of getting adequate food habit data are good because it is unlikely that both stomach and colon are simultaneously empty.

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TABLE 3. Year of capture, number, and sex of cougars studied in northeastern Oregon.

Year	No. of cougars	No. of males	No. of females
1976	4	3	1
1977	21	13	8
1978	22	10	12
1979	17	7	10
TOTAL	64	33	31

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